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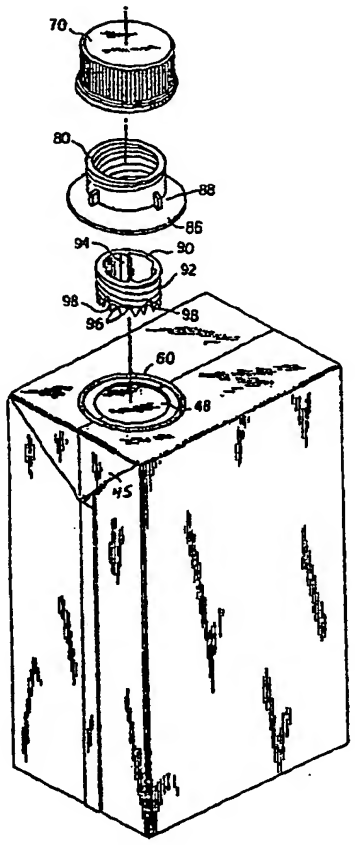
(54) Title: ASEPTIC BRICK PACKAGE

(57) Abstract

A brick type container, particularly adapted for aseptic packaging of liquid foodstuffs, is formed having optimum dimensions and location of a pour spout fitment (70, 80, 90) thereon. The dimensions of the pour spout components are chosen for optimum performance. The top of the container carries a dispensing opening (36) covered by a frangible extrusion coating (48). The fitment is applied to the container by applying it while the container is encased in a pocket a conveyor, the pocket sides being rigid.



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ASEPTIC BRICK PACKAGE

BACKGROUND OF THE INVENTION

This invention relates to containers and more particularly to brick-type containers fashioned from paperboard and particularly adapted for aseptic packaging of liquids and other foodstuffs. Brick-type containers are in the general form of a rectangular parallelepiped, and take their name from their resemblance in shape to a common masonry brick. Typically, one end of the package is provided with a plastic fitment, the fitment including a screw cap and a pouring nozzle. The material from which the container is fashioned is typically paperboard coated on one or both of its surfaces with one or more layers of various known barrier materials such as polymeric barrier materials.

Examples of this general type of container and fitment pouring spout are seen in U.S. Patents 4,948,015 and 5,027,979 issued to Kawajiri et al and 4,483,464 issued to Nomura. Such containers have typically been used in the packaging of potable liquids, such as milk and fruit juice. Brick style packages are the packages of choice but it is obvious that the spout and container construction can be used on other package shapes, such as gable top containers.

SUMMARY OF THE INVENTION

According to the practice of this invention, optimum dimensions and proportions of a pour fitment and an aseptic brick package are employed. The specific adhesives employed, the area of adhesive coverage needed to prevent leakage, the amount of adhesive, and the specific location of the fitment on the package, as well as the extrusion overvoid area

over the pour spout dispensing opening are employed for optimum results. Typically, in carrying out this invention, the pour spout fitments are located above the incoming filled aseptic brick packages, the packages being filled with milk or fruit juice. A hot melt adhesive bead or ring is applied around the perimeter of a dispensing opening which is spanned and closed by one or more barrier layers coating the paperboard. The fitment, provided with a lower flange and of molded plastic, is placed on top of the hot melt adhesive and pressure is applied. Next, the filled brick containers are conveyed, over a period of four to five seconds, with pressure maintained on the fitment flange area, to chill and set the hot melt adhesive. Lastly, the completed packages are conveyed to a pallet area for loading and packaging.

In order to provide a firm or rigid base for placing the fitment onto the top of the container, the liquid filled containers with their sides bulging somewhat from the weight of liquid therein, are placed into rigid pockets of a conveyor. The rigid side walls of the pockets cause the container side walls to straighten and hence force the level of liquid upwardly so as to come into contact with the inner surface of the container top.

In this way, when a fitment flange is placed above the adhesive ring and pushed down, the container top will not bend downwardly due to the incompressibility of the liquid, and a firm adhesive bond will result.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a plan view of a unitary paperboard blank from which the carton of this invention is formed.

Figure 2 is a perspective view of a formed, filled

and sealed aseptic container according to the practice of this invention.

Figure 3 is a view illustrating the container of Figure 2 after it has been placed in a pocket of a pocketed conveyor.

Figure 4 is a view similar to Figure 3 and illustrates the aseptic container after it has been provided with a continuous bead of a hot melt adhesive around its upper dispensing opening.

Figure 5 is a view similar to Figure 4 and illustrates the placement of the fitment on the aseptic container while the container is still in a pocket of a pocketed conveyor.

Figure 6 is a view of a filled carton, the carton provided with a three component plastic pour and rupture fitment shown as exploded.

Figures 7, 8, and 9 are respective transverse cross sectional views of the three parts of the fitment of Figure 6.

Figure 10 and 11 are transverse sections illustrating the seal piercing action of the fitment.

Figure 12 is a view taken substantially along section 12-12 of Figure 10.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to Figure 1 of the drawings, a unitary blank of paperboard or other stiff, foldable and resilient material is designated as 10. The blank is rectangular with its central longitudinal axis horizontal and its central transverse axis vertical and has two horizontal score lines 12. Vertically extending fold lines 20, 24, 26 and 28 extend from the top to the bottom edges of the blank, with the distance between the left and right blank edges and respective score lines 20 defining left and right borders or

strips 30. Forty-five degree score lines 32 extend from the four corners, respectively, to the intersection of score lines 24 and 12. Forty-five degree score lines are also located, as indicated, at the middle of the blank and extend from respective points on respective score lines 14 to the intersections, respectively, with score lines 26 and 12. Dispensing aperture 36 is cut through the blank, with its center being below the top edge of the blank on imaginary axis 38 which intersects score line 28. Polymeric extrusion barrier layers 47 (known in this art) cover both surfaces of the blank, as shown at Figure 10 and 11, and are squeezed together to form a layer 48 which spans opening 36.

The above described score lines define panels 40, 42, and 46, with panels 40 defining the front and rear walls of the carton and panels 42, when folded together with their edges, define side walls of the carton. The top of the carton is defined by panels 44, while the bottom of the carton is defined by panels 46.

The length of blank 10 is about 18.58 inches (472 mm) and its width is about 6.70 inches (170.2 mm).

The blank of Figure 1 is folded and glued and filled with a liquid in a manner known in this art to form a brick type package shown at Figure 2. Triangular flaps 45 (see Figure 6) extend from the top of the carton and down onto the sidewalls and overlap side seams defined by sealing together zones 16. Flaps similar to 45 are formed at the bottom of the carton, with flaps 45 defined from the upper and lower ends of panels 44, with the (not illustrated) corresponding triangular flaps of the bottom defined by the upper and lower edges of panels 46. The general shape and the manner of formation of the carton shown at Figure 2 is known in this art. The height of the carton or

container is about 6.57 inches (167 mm) and its thickness is about 2.44 inches (62 mm) and its width is about 3.70 inches (94.2 mm).

Referring now to Figure 3, the carton of Figure 2 has been placed in a pocket on a conveyor, the pocket defined by upstanding rigid walls 50 and 52. It will be understood that an endless conveyor of any conventional construction carries a plurality of such pockets and it is only necessary to illustrate one pocket for an understanding of this invention. After the filled and sealed container is placed in the pocket shown at Figure 3, the sidewalls of the container no longer bulge, because of the rigidity of walls 50 and 52. Because the four sides of the container no longer bulge outwardly, this forces the level of the liquid in the container upwardly so that there is practically no void or space between the bottom surface of the top of the container and the top of the liquid in it. In some cases, only sides 50 are required for back pressure depending on the viscosity of the product contained.

Figure 4 is similar to Figure 3 except for a ring or band of adhesive 60 having been placed around dispensing opening 36. The dimensions of this ring of adhesive are critical, as is the location of dispensing opening 36 relative to the top of the container. The bead 60 is 0.125 inches (3.2 mm) wide.

Referring now to Figure 5, a flanged plastic pour spout fitment has been placed on top of the container. This is illustrated at Figure 5 wherein the flange of the plastic pour spout fitment (shortly to be described) has been placed onto adhesive ring 60 and squeezed downwardly. Such downward motion would ordinarily cause a flexing or bending down of the top of the container. Such flexing would result in an improper adhesive connection between the plastic

fitment and the container. By virtue of being in a pocket defined by walls 50 and 52, the outward bulges of the container no longer exist and the top of the liquid is forced against the bottom of the top closure, as explained above. The top of the liquid thus provides a firm backing when the plastic fitment is pushed down upon and secured to the container. If the liquid has a head space above it, instead of the liquid contacting the top, then the increased air pressure will provide a firm backing. Analogously, if gable top type liquid packages are used, instead of brick type packages, the same back pressure action would occur to inhibit deformation of the fitment accepting panel. The flange of the fitment is 0.125 inches (3.2 mm) from the nearest edge of the container, while the diameter of the flange is 1.625 inches (41.3 mm).

Referring now to Figure 6, the filled container with adhesive ring or bead 60 around its dispensing opening, the latter closed by the above described barrier layer material, is shown in relation to the plastic fitment, the latter shown exploded. This provides exactly the right amount of adhesive to fill the dam between the rings 102 and 104 on the bottom of the spout flange when pressure is applied in the fitment application process. The fitment is shown in detail at Figures 7, 8, and 9 and includes an outer screw cap 70, an intermediate flanged spout member 80, and a piercing element 90, the latter adapted to tear the frangible barrier layer material 48 spanning the dispensing opening at the time of initial dispensing of the contents.

Figure 7 illustrates outermost plastic cap 70 which includes a plurality of internal threads 72, four downwardly extending arms 74, and a base flange 76.

Figure 8 shows the intermediate fitment spout

member 80 having a plurality of inner threads 82 and outer threads 84, the latter terminating in a base flange 86. The outside diameter of flange 86 is 1.625 inches (41.3 mm) and was determined to be optimum in terms of: (a) providing enough surface area for bonding to the package; and, (b) being small enough to allow placement of the pourhole opening as close as possible to the pouring edge of the carton. The closer the pourhole is to the carton edge, the easier it is to pour without spill or glug. The flange of the fitment is 0.125 inches (3.2 mm) from the score line that forms the pouring edge of the carton. The thickness of flange 86 is 0.02 inches (0.5 mm), not including the height of glue dams 102 and 104. Abutments 88, shown also at Figure 6, are positioned at 90 degree intervals around the upper portion of flange 86.

Figure 9 shows cutting element 90 having a plurality of external threads 92, four vertically extending ribs 94 and lower circumferential cutting teeth 96, the latter terminating in tips 97. Teeth 96 are interrupted by annularly spaced inverted V shaped drain grooves 98. Grooves 98 provide improved liquid evacuation from the package. The height of cutting teeth is 0.125 inches (3.2 mm). This tooth height has been determined to be critical in yielding a clean cut on extrusion layer 48, as opposed to a ragged opening. The spout of the fitment was designed especially for adhesion to the aseptic package. The flange 86 is 0.020 inches (0.5 mm) thick, not including glue dams 102 and 104. Also, the spout is made of polyethylene. These two features allow the flange to flex with the package, reducing the danger of the spout detaching from the package during handling and distribution. The thicker and less flexible spout wall does not flex and aids in protecting the extrusion from the teeth of the

insert.

Figure 10, taken along section 10-10 of Figure 5, shows the pour spout plastic fitment adhered to and mounted on a filled container. The liquid within the container is not illustrated. Flange 86 of the fitment is in adhesive contact with the top of adhesive bead 60, the latter passing from a round cross section to a generally flat cross section upon downward squeezing by the fitment, with the adhesive joining the fitment to the container. Both outer and inner (upper and lower) extrusion barrier layer coatings 47 are shown, and their fusion, in this art, has produced layer 48 which spans dispensing opening 36. Figure 10 is the configuration of the fitment prior to initial opening of the fitment and container for dispensing. It will be noted that tips 97 of teeth 96 are above the lowermost surface of beads 102 and 104 of flange 86. It has been found that this difference in height, for optimum results, is 0.0625 inches (1.59 mm). This distance is built in to protect extrusion 48 during package distribution by preventing contact of teeth tips 97 with extrusion 48. This difference in height further permits the assembled fitments of Figure 10 to be conveyed on a flat surface to an assembly station without injury of breakage of tips 97.

Turning now to Figure 11, fitment cap 70 has been rotated so as to unscrew it from threads 84, causing the cap to move upwardly. Because of the interaction between posts 74 on vertically extending ribs 94 (see Figure 9) cutting member 90 is simultaneously rotated in the same direction, but, because of the pitch of the threads 92 and 82, the cutting portion 90 moves downwardly to rotate and cut the peripheral portions of extrusion layer 48 as it rotates. For convenience in illustration, Figure 11 shows the top cap completely

off of the fitment, with the contents of the container now being ready for dispensing. After the initial dispensing, cap 70 is screwed down upon the fitment until the next dispensing operation.

Figure 12 is a view taken along section 12-12 of Figure 10 and illustrates the relation between the several elements of the plastic fitment to yield the above described action. Inner and outer integral molded beads 102 and 104, respectively, border the inner and outer peripheries of the bottom surface of flange 86. Both are of a height of 0.01 inches (0.25 mm). The continuous annular space between these beads is denoted as 106 and is textured. For convenience in illustration, only a limited annular portion of the flange bottom is shown as textured, it being understood that the texture runs completely around the flange. The texture is defined by intersecting molded grooves. Beads 102 and 104 serve as dams to contain hot melt adhesive 60 and prevent the hot melt from oozing out from under flange 86 during application of the fitment flange to the package.

The dimensions of the blank and of the fitment parameters set out above are for a one liter container.

CLAIMS:

1. A carton formed from a unitary paperboard blank, the carton having top, bottom, and side walls, each of said walls having an interior and an exterior surface, with at least one of said surfaces of each said wall covered by a barrier layer, said top wall having a dispensing opening, said dispensing opening spanned by said barrier layer, said dispensing opening having an annular bead of a hot melt adhesive around said opening and on said exterior surface of said top wall, a threaded plastic pour spout fitment having a continuous lower flange, said fitment flange having a lower surface, said fitment including an annular cutting element having cutting teeth, said teeth having tips, said tips located above said dispensing opening and above said lower surface of said flange, said lower surface of said flange contacting said adhesive and thus securing said fitment to said exterior surface, said lower surface of said fitment flange having a radially inner continuous integral bead extending downwardly therefrom and having a radially outer continuous integral bead extending downwardly therefrom, said adhesive located radially between said inner and said outer continuous beads, said continuous beads serving as dams to contain said adhesive and prevent said adhesive from oozing out from beneath said fitment flange when the fitment flange is applied to the container top wall.

2. The carton of claim 1 wherein said paperboard blank is rectangular having a width of 6.7 inches (170.2 mm) and a length of 18.58 inches (472 mm) and wherein said carton is 6.57 inches (167 mm) in height and 2.44 inches (62 mm) in thickness and 3.70 inches (94.2 mm) in width.

3. The carton of claim 1 wherein said fitment

flange is 1.625 inches (41.3 mm) in diameter.

4. The carton of claim 1 wherein said bead of adhesive is 0.125 inches (3.2 mm) in width prior to its being squeezed by said flange.

5. The carton of claim 1 wherein said flange is 0.02 inches (0.5 mm) in thickness.

6. The carton of claim 1 wherein the height of each of said cutting teeth is 0.125 inches (3.2 mm).

7. The carton of claim 1 wherein the lower surface of said flange is textured.

8. The carton of claim 1 wherein said flange has inner and outer peripheral portions each provided with a continuous bead 0.01 inches (0.25 mm) in height.

9. The carton of claim 8 wherein the distance between the tips of said teeth and the lower surface of said beads is 0.0625 inches (1.59 mm).

10. The carton of claim 1 wherein said flange is 0.125 inches (3.2 mm) from the nearest edge of the carton.

11. The carton of claim 1 wherein the diameter of said dispensing opening in said top wall is 1.0625 inches (27 mm).

12. A process for the production of liquid filled paperboard packages, said process including the steps of, filling a paperboard container with a liquid, said container having a dispensing opening in its top wall, said dispensing opening being spanned and covered by a frangible barrier layer, placing said liquid filled container into a rigid pocket to thereby remove outward bulging at the sides of said container and thereby forcing said liquid up against the inner surface of the top of the container, applying a ring of adhesive around said dispensing opening, applying the lower surface of the flange of a flanged pour spout fitment onto said adhesive ring by downward pressing, whereby

the top of the container does not bend downwardly upon application of the flange.

13. A process for the production of liquid filled paperboard packages according to Claim 12, wherein said adhesive ring is a hot melt adhesive, said lower surface of said fitment flange has a radially inner continuous integral bead extending downwardly therefrom and has a radially outer continuous integral bead extending downwardly therefrom, said adhesive located radially between said inner and said outer continuous beads, said continuous beads serving as dams to contain said adhesive and prevent said adhesive from oozing out from beneath said fitment flange when the fitment flange is applied to the container top wall.

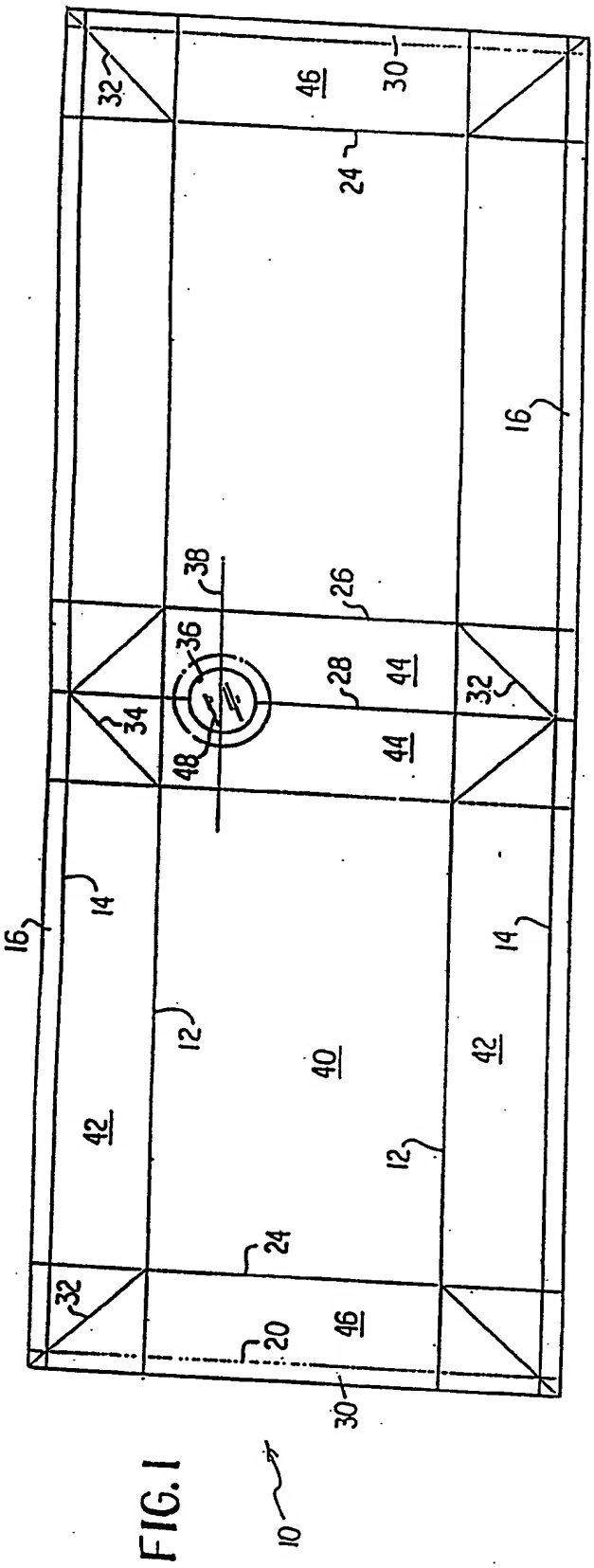


FIG. 1

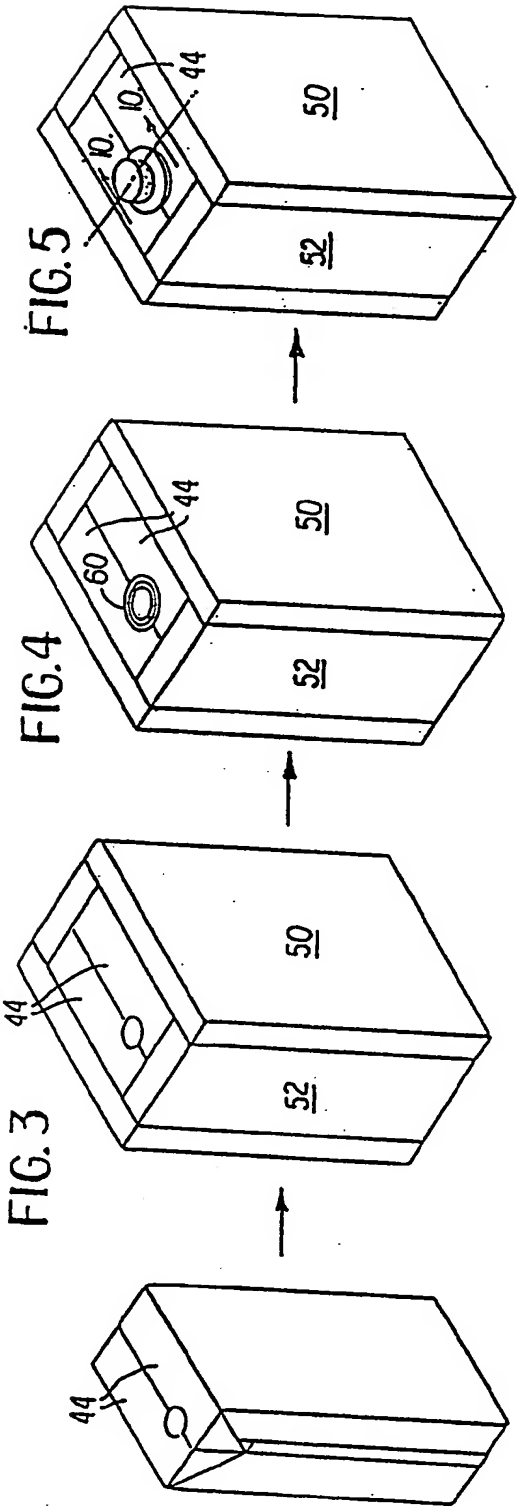


FIG. 2

FIG. 3

FIG. 4

FIG. 5

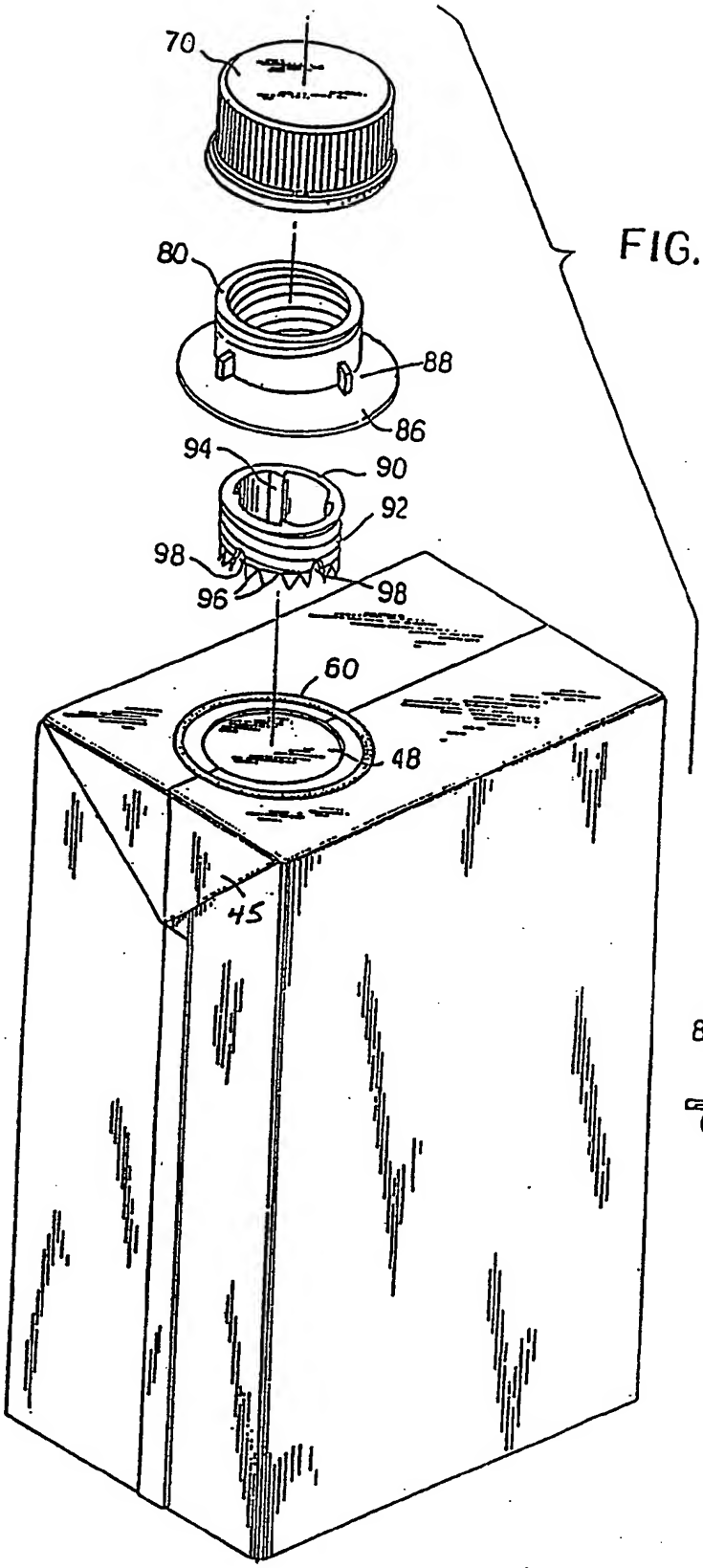


FIG. 6

FIG. 7

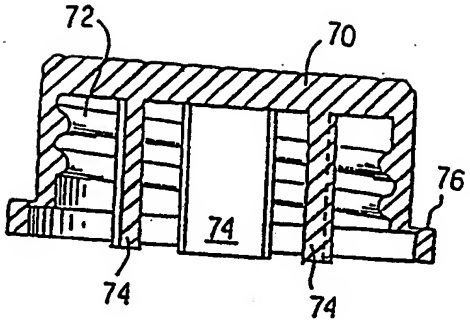


FIG. 8

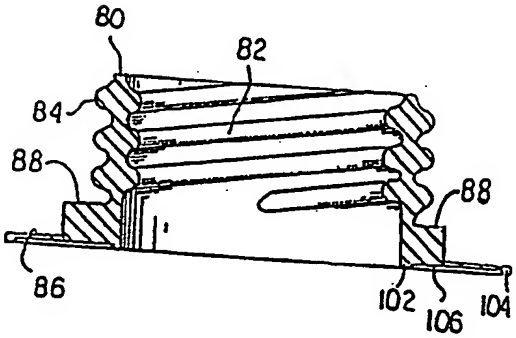


FIG. 9

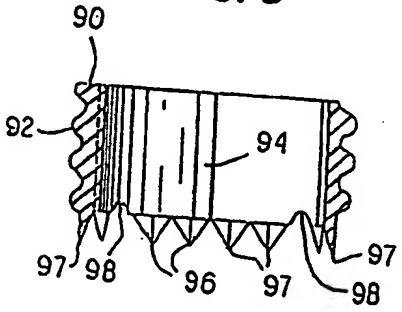


FIG. 10

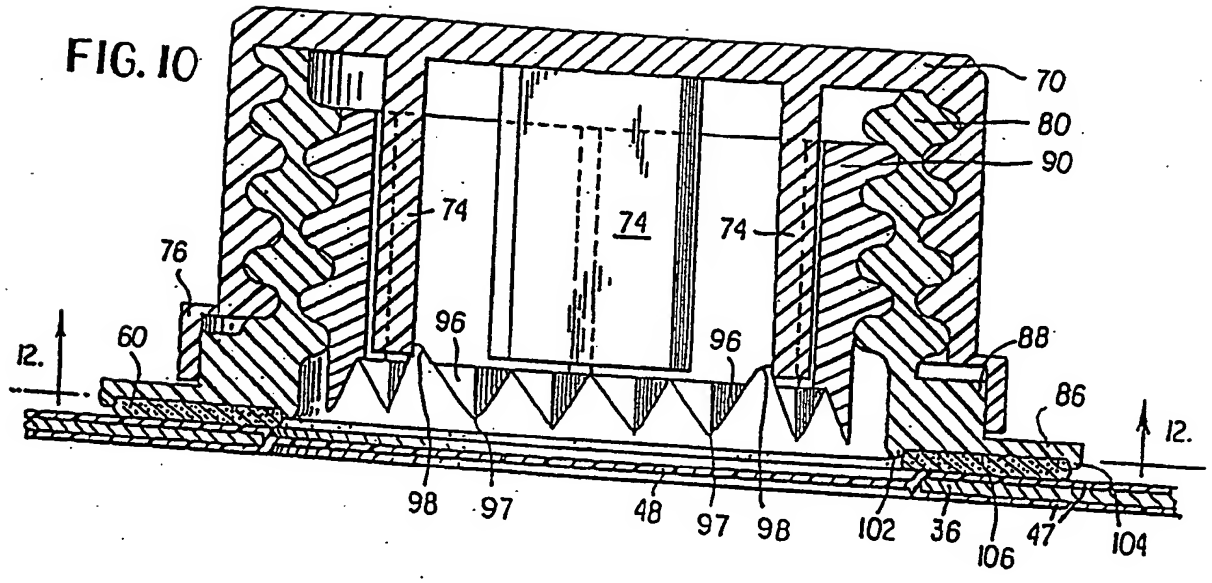
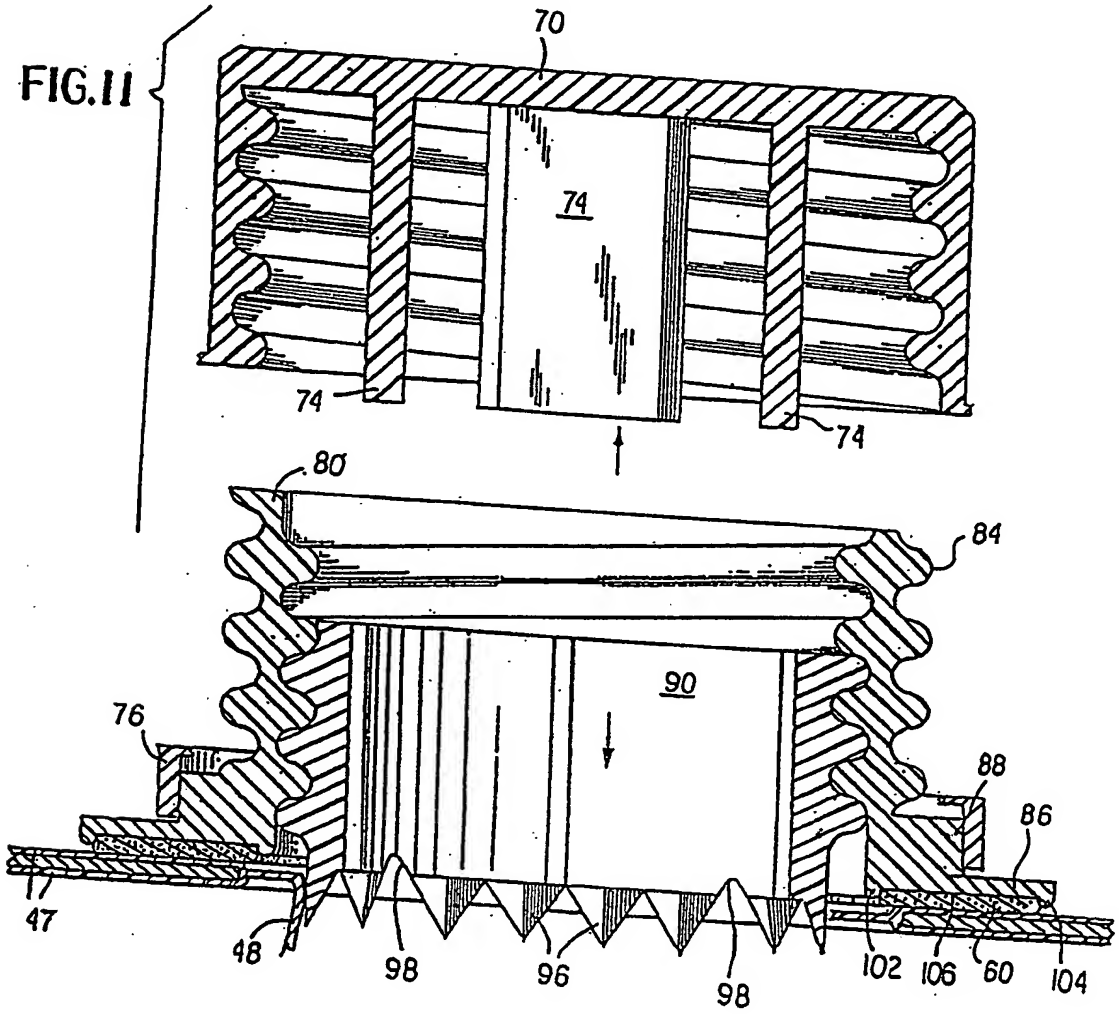


FIG. 11



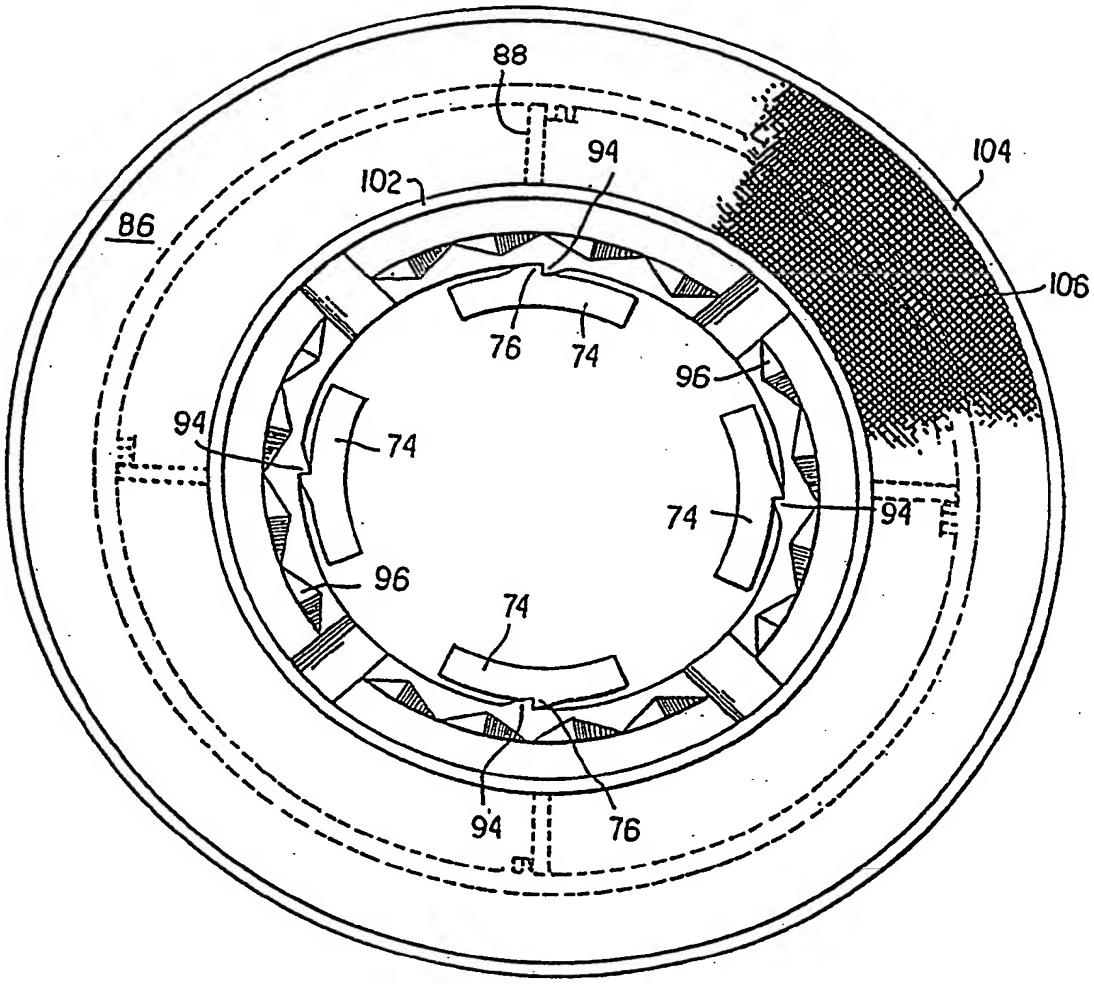


FIG. 12

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US94/08725

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :B67D 5/00
US CL :222/083.5, 105

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 222/081, 083, 083.5, 088, 089, 091, 105

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,141,133 (Ninomiya et al.) 25 August 1992, see entire document.	1-11
Y	US, A, 4,562,940 (Asphar) 07 January 1986, see entire document.	1-11
A	US,A, 4,560,090 (Okushita) 24 December 1985.	-
A	US, A, 5,297,696 (Bernstein et al.) 29 March 1994.	-

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Date of the actual completion of the international search 05 OCTOBER 1994	Date of mailing of the international search report 21 OCT 1994
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